LEGIONNAIRES' DISEASE PUBLIC HEALTH ROLE

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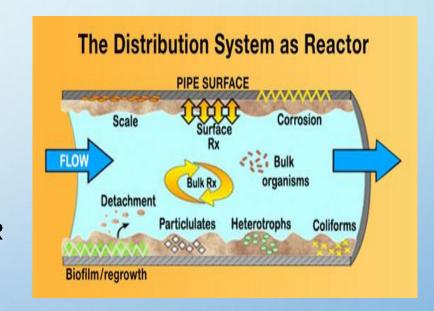
JUNE 27, 2019





LEGIONELLA ECOLOGY

- 60%+ OF WATER SUPPLY
- NOT TESTED FOR IN PUBLIC WATER DISTRIBUTION SYSTEM
- LOW NUMBERS IN COLD WATER SUPPLY
- AMPLIFICATION IN HEATED WATER REQUIRED FOR GROWTH
- LIVES IN BIOFILM IN SYSTEM—ASSOCIATED WITH PROTOZOA & OTHER ORGANISMS
- CAN BECOME AEROSOLIZED, DISPERSED THROUGH FIXTURE











SOURCES

- Municipal water supply
 - 95% of cases
- Decorative Fountain
- Hot tub
- Shower
- Cooling tower
- Unoccupied floors/rooms
- Summit County
 - Incidence rate

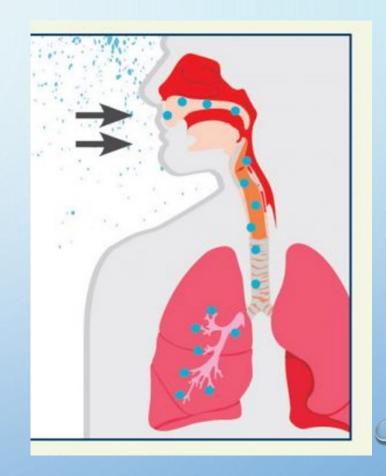






TRANSMISSION

- AIRBORNE
- INHALATION AND/OR ASPIRATION OF WATER MIST OR VAPORS
- WATER VAPOR CAN BE WARM OR COOL
- NOT PERSON TO PERSON TRANSMISSION







LEGIONELLOSIS RISK FACTORS

Current or former smoker

Chronic lung disease

Diabetes

Chronic kidney or liver disease

Immunosuppressed

Cancer

50 years or older





CASE INTERVIEW





TYPES OF CASES

Travel associated

Healthcare associated

Community acquired





INVESTIGATION

Determine type of case

2

Look for common exposures

3

Notify
Environmental
Health to assess
building and
possible
sampling

4

Notify individuals exposed

5

Conduct active surveillance



OUTBREAK DEFINITION

Nosocomial

• Two or more cases in a healthcare facility within 6 months

Community

Three or more
 cases (not
 nosocomial)
 identified in 30
 days

Travel

• Two or more cases in the same travel accommodation within 12 months





OUTBREAK INVESTIGATION: EPI

1

Identify additional cases

2

Provide education

3

Implement active surveillance

4

Identify sources of exposure

5

Develop risk communication plan



Implement immediate control measures





EPI OUTBREAK CHALLENGES



NOSOCOMIAL

- RESIDENTS "HOME"
- MAINTAIN DAILY ACTIVITIES
 - LIMIT EXPOSURE RISKS
 - LIMIT DISRUPTIONS
- HEALTH/ HYGIENE CONCERNS
- MULTIPLE HEALTHCARE PROVIDERS
- WATER SAMPLE TEST RESULTS
 - 5-7 DAYS FOR LAB RESULTS
 - MULTIPLE ROUNDS OF TESTING...
- COMMUNICATION/COOPERATION

COMMUNITY/TRAVEL

- MULTIPLE POSSIBLE SOURCES
 - HOME, WORK, RECREATION
- GUEST TRACEBACK
 - SECONDARY BOOKING MARKET
 - MULTIPLE HOTELS MAY BE INVOLVED
 - MULTIPLE POSSIBLE SOURCES
 - OFTEN MORE COMPLEX WATER
 SYSTEMS



OUTBREAK INVESTIGATION: ENVIRONMENTAL

Environmental Assessment and Sampling

Assess building water systems and maintenance

Identify high risk areas

Sampling of water systems

Internal and external factors that can lead to Legionella growth

Construction

Water main breaks

Biofilm/sediment in pipes

Water temperature, stagnation, and pressure changes

pH levels

Inadequate disinfectant

Remediation

Super heating and flushing

Hyper-chlorinating

Copper silver ionization

UV light systems





WATER SAMPLING

Water heaters- temperatures noted

Patient/resident/guest room- temperatures noted

In-coming water supply

Other areas of concern

Note: Sample results only reflect conditions at time of sampling











INITIAL REMEDIATION

System flush

Drain water heaters

Fill, heat 140-160 ° F, Drain

Fill, hot water shock

All fixtures and outlets for 15-20 minutes

Not a long-term solution





ENVIRONMENTAL HEALTH CHALLENGES

No Uniform Standard

EPA MCLG-0 cfu/ml

OSHA >1, >10, >100 cfu/ml PEL

European Standard 0-10,000 cfu/ml

VBNC-Viable but not culturable

Highly variable infectious dose

State/Federal hot water temp 110 °F max health care facilities



DEPARTMENT OF HEALTH & HUMAN SERVICES CENTERS FOR MEDICARE & MEDICAID SERVICES MEMO JUNE 2, 2017

FACILITY REQUIREMENTS TO PREVENT LEGIONELLA INFECTIONS: FACILITIES MUST DEVELOP AND ADHERE TO POLICIES AND PROCEDURES THAT INHIBIT MICROBIAL GROWTH IN BUILDING WATER SYSTEMS THAT REDUCE THE RISK OF GROWTH AND SPREAD OF LEGIONELLA AND OTHER OPPORTUNISTIC PATHOGENS IN WATER.





HOTEL OUTBREAK

HOTEL OUTBREAK- EPI

SLCOHD NOTIFIED- 09/12

- OUT-OF-STATE RESIDENT
- POSITIVE LEGIONELLA URINE ANTIGEN;
 POSITIVE RESPIRATORY CULTURE
- ONSET- 08/31
- SL COUNTY HOTEL STAY- 08/26- 08/27
 - JETTED TUB IN ROOM
- MULTIPLE HOTEL STAYS IN OTHER STATES
 WITHIN INCUBATION PERIOD
- PASSED AWAY





HOTEL OUTBREAK- EPI

SLCOHD INITIATED

- ACTIVE SURVEILLANCE
- EH NOTIFIED

SLCOHD NOTIFIED - 10/12

- 2ND PATIENT REPORTED
- OUT-OF-STATE RESIDENT
- POSITIVE LEGIONELLA URINE ANTIGEN
- ONSET- 09/28
- SL COUNTY HOTEL STAY- 09/20- 09/22
 - NO POOL, HOT TUB OR JACUZZI USE





HOTEL OUTBREAK- EPI

- OUTBREAK IDENTIFIED
- EPI-X ALERT POSTED BY UDOH
 - NOTIFICATION OF PUBLIC HEALTH PROFESSIONALS INVOLVED IN IDENTIFYING, INVESTIGATING, AND RESPONDING TO PUBLIC HEALTH OUTBREAKS
 - REPORT ANY CONFIRMED OF SUSPECT LD CASES WITH SIMILAR TRAVEL HISTORY OR STAY



COMMUNICATION

- HOTEL MANAGEMENT
 - OUTBREAK EDUCATION
- GUEST NOTIFICATIONS
 - HOTEL REGISTRATION/ BOOKING
 - EDUCATION
- PIO'S
- PARTNERS
 - CDC
 - STATE/ LOCAL HEALTH DEPARTMENTS
 - HEALTHCARE PROVIDERS
 - LABORATORIES









- HOTEL SITE VISIT
 - ENVIRONMENTAL ASSESSMENT
 - BUILT 1995
 - THREE STORIES
 - 88- GUEST ROOMS
 - POOL
 - HOT TUB
 - JACUZZI
 - IDENTIFY POTENTIAL HIGH RISK EXPOSURES
 - WATER SAMPLES
 - WATER RESTRICTIONS





- PATIENT SAMPLES
 - RESPIRATORY CULTURE- WGS*
 - URINE ANTIGEN
- WATER SAMPLES- 10/14
 - INITIAL SAMPLES (COMPOSITE)

WATER HEATERS (3)

ROOM 321 (JACUZZI)

ROOM 335 (CASE ROOM)

80,000 CFU/L

40 CFU/L

0 CFU/L

* SEQUENCE-BASED TYPING (SBT) RECEIVED FROM CDC—CLINICAL & ENVIRONMENTAL SAMPLES BOTH FOR LEGIONELLA PNEUMOPHILA SEROGROUP 1 MAB (1,2,5) FIRST TIME THIS SEROTYPE SEEN IN THE U.S.









REMEDIATION

- EH RECOMMENDATIONS
 - INSTALL THERMOMETERS ON WATER HEATERS
 - HEAT/ FLUSH
 - WATER HEATERS TO 165° F- HOLD FOR 60 MINUTES- FLUSH
 - RE-FILL- HOLD 30 MINUTES- FLUSH
 - RE-FILL- REDUCE TEMP TO 140° F
- WATER SAMPLE RESULTS- 11/01
 - WATER HEATER L 540 CFU/L
 - WATER HEATER C 940 CFU/L
 - WATER HEATER R 1280 CFU/L



REMEDIATION

- CITY WATER SYSTEM—
 - WATER MIXTURE IN AUGUST---WELL & SURFACE
 - CHANGED TO SURFACE- 10/1
- THERMOSTATIC MIXING VALVE INSTALLED
- WATER SAMPLES- 11/10
 - IN-COMING WATER SUPPLY 0 CFU/L
 - WATER COMP
 0 CFU/L
 - ROOM 313 COMP 0 CFU/L

 (ALL SUBSEQUENCE TESTING- ND)









PREVENTION







WHEN IS THE OUTBREAK OVER? HOW GOOD IS "GOOD ENOUGH?











Questions?



